MASTER BEDROOM REMOTE CONTROL SYSTEM

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MEI 2007

"I hereby declared that I have read through this report and found that it has comply the partial fulfillment for awarding the degree of Bachelor of Electrical Engineering (Power Electronics and Drives)."

Signature   : ....
Supervisor's Name : ..... Mohamed Asmi b. Said .....
Date   : ..... 7| 5|2007 .....

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This report Is Submitted In Partial Fulfillment Of Requirement For The Degree Of Bachelor In Electrical Engineering (Power Electronics and Drives)

Fakulti Kejuruteraan Elektrik
Universiti Teknikal Malaysia Melaka

May 2007

"I hereby declared that this report is a result of my own work except for the excerpts that have been cited clearly in the references."

Signature   : ....

Name   : NURLYANA ABDUL AZIZ

Date   : 7 MEI 1963 2007

Dedicated to beloved mama and abah,

My family,

Lecturers and UTeM members,

Bomot and Bunny,

My friends,

And those who contribute in the process.

ACKNOWLEDGEMENT

First of all i would like to express my gratitude to Allah S.W.T for I had able to finish my Bachelor Degree Project entitled *"Master Bedroom Remote Control System"* within time. This Bachelor Degree project had taught me a lot and gave me a tremendous experience. I also would like to expres my greatest gratitude to my family, friends and UTeM members for their support and helps.

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ABSTRACT

As a result of scientific and technological advancement, more and more products were designed to make the world a better place to live. In this project, entitle, *"Master Bedroom Remote Control System"*, a system that can control the switch of typical electrical appliances in the master bedroom is designed. The remote control system designed is able to complement the manually operated switches. This system consists of two main parts; being the transmitter & receiver and the switching mechanism. The transmitter and the receiver used in this design operate at 27.9 MHz frequencies. The switching device used for this project comprise of solid-state relays and 8052 microcontroller. This design is meant to be an improvement of a previously designed circuit. The introduction of a microcontroller in the circuit allow a more flexible and varied controlling mechanism be implemented. The program to operate the microcontroller was also written. The circuit was found to be functioning. However, the integration of the microcontroller to facilitate smooth control required further development.

ABSTRAK

Hasil daripada kemajuan sains dan teknologi, kini semakin banyak produk dihasilkan untuk melengkapkan lagi kehidupan kita. Dalam projek ini yang bertajuk, *"Sistem Kawalan di Bilik Tidur Utama"*, satu sistem yang berkemampuan untuk mengawal kebanyakan peralatan elektrik di dalam bilik tidur utama telah dicipta. Sistem alat kawalan jauh yang direka mampu menjadi sebagai pelengkap kepada suis kendalian manual yang sedia ada. Sistem ini mengandungi dua bahagian penting iaitu penghantar & penerima serta mekanisma pensuisan. Penghantar dan penerima yang digunakan di dalam sistem ini beroperasi pada frekuensi 27.9MHz. Alatan pensuisan yang digunakan di dalam projek ini terdiri daripada geganti jenis "solid-state" dan mikropengawal 8052. Rekaan ini adalah bertujuan sebagai pembaharuan daripada litar yang telah direka sebelum ini. Pengenalan kepada mikropengawal di dalam litar membolehkan kawalan yang fleksibel dan pelbagai dapat diimplemenkan. Program bagi membolehkan mikropengawal berfungsi juga dihasilkan. Litar ini didapati berfungsi dengan baik. Namun, penggabungan dengan mikropengawal bagi melicinkan proses kawalan memerlukan kajian yang lebih mendalam.

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LIST OF ABBREVIATIONS

LED	-	Light Emitting Diode
DB	-	Distribution Board
NC	-	Normally Close
NO	-	Normally Open
COMP	-	Common
IC	-	Integrated Circuit
RAM	-	Read Access Memory
ROM	-	Read Only Memory
EPROM	-	Eraseble Programmable Read Only Memory
MCB	-	Miniature Circuit Breaker
L	-	Life
N	-	Neutral
G	-	Ground
V	-	Volt (Voltage)
RC	-	Radio Control

LIST OF ATTACHMENTS

NO   **TITLE**

A   Microcontroller 80C52 Datasheet

B   ULN 2803 Integrated Circuit Datasheet

C   PhotoMOS Relay Schematic and Wiring Diagrams

D   RF remote Control

CHAPTER I

INTRODUCTION

1.1   Introduction

Nowadays the use of manual switches is common to start (on) and stop (off) the electrical appliances in the house. In the advancement of the automation technology today, there are many control system that had use a microcontroller or a microprocessor as an application for an embedded system to execute the control process. To make the control process simpler, there is few control system that can be apply from a distance. A few of the examples are by using wireless, broadband, *InfraRed* and telephone line. A safety features is quite important in order to make the remote control device perfect.

The *"Master Bedroom Remote Control System"* project is actually a continuation of a previous Bachelor Degree Project. In this project a few adjustment will have be made to the previous project in order to improve this system so that it can be commercialized. The adjustments that were made are the introduction of a microcontroller and the adjustment of the original relay circuit. The scope of this project can be expanded to a bigger area, but in this project the highlight will be for the master bedroom only.

1.2 Project Objectives

The main objectives of this project are:-

1) To design a remote control system that integrate with a microcontroller in the circuit and able to complement the manually operated switches
2) To apply the remote control system for controlling electrical circuit in master bedroom
3) To test and commission the remote control system
4) To design a remote control set that is appropriate and can be commercialized in the future.

1.3 Project Scope

This project is a continuation from the previous project that had been done. By referring to this previous project, problems that had occurred were recognized and solutions are proposed to overcome these problems. Additional items were also added to the project to improve it and making it more interesting. This project is also design to suit the commercialize need so that it can hit the market. In this project the type of microcontroller that was used is the 8052 microcontroller.

1.4   Problem Statement

Living in this new science and technology era, more and more products were design to meet the user demand on high standard living life quality. Even though there are lots of things that were introduced, we still use a manually operated switch to control all the electrical appliances in our house. This can be uncomfortable to the user as they had to get up and operate the electrical appliances manually.

This problem however can be solved by using a single remote control to control all the electrical appliances with just a button. The user can choose either to operate the electrical appliances using a remote control or using a manual switch. For this purpose and for commercial purpose, a standard system for this kind of remote control will also have to be design so that almost everyone can choose either to use this system in their house or to use a manually operated switch.

This project is actually based on previous Bachelor Degree Project (PSM). During the previous time this project was conducted, a switching problem had occurred. There isn't any latch used in the circuit, thus making the lamp turns off after the remote button is released. Therefore, in this project all the problems were identified and a new design will be proposed to overcome these problems. Other than that, to compete with the development of the market today, a microcontroller was introduced as a part of the switching device in this system.

The remote control set which is consisting of the transmitter and the receiver will also be redesign so that it can be commercialized. Both the transmitter and the receiver will also have to be very reliable to the user.

1.5 Project Methodology

The project methodology is the most important planning agent in deciding the destination of project. There are a few methods that can be practically implemented to solve the arising problems in the project making process. Below are listed a few of the methodology that were used in this project.

1.5.1 Project Planning

Before starting a project, an adequate planning must be made with respect to the aspect such as the ability, the cost and the most important thing is the target. The project planning was highlighted as it is important to make sure that the project will work well without any difficulty. Without any plans, a project will not work well and will face a lot of problems. The first part is the most important part in the project methodology because the project results will depend on the planning that had been made.

1.5.2 Literature and Development

A study on the project is important to make sure that it can reach a good level of understanding regarding the topic so that it will reach the targeted objectives. Furthermore, a research on the tools and the components needed in the project is important. The role and the functionality of the tools and the components must be understood including the software needed, structure model, control circuit and many more. With all the understanding of these things, the integration between the hardware and the software can be made successfully and project can be totally implemented.

1.5.3   Designing

The designing process can only be done after figuring all the importance and the need of the project. This process can be divided into two main parts which are the hardware and the software. This process is very important as it will results that the prototype that will be built is according to the project objectives and the early planning.

1.5.4   Hardware and Software Integration

The integration part is the part where the prototype of the project will be built. This part can only be done after the designing part is finish. At this level the software for the microcontroller will be conducted by using a simulation and then written into the ic and tested with the transmitter, receiver and relay circuit. The software should be able to show the output based on the software that had been written in the ic.

1.5.5   Testing and Commissioning

The last part of the methodology is the testing of the whole prototype. This part will be done only after all the development process had finished. Through this process the effectiveness of the integration of the hardware and the software will be proven through the output display.

1.6 Project Planning (Gantt Chart)

Table 1.1: Gantt chart for _"Master Bedroom Remote Control System"_ Project

PROJECT PLANNING												
	2006						2007					
Project's Activities	J	J	A	S	O	N	D	J	F	M	A	M	J
Project Title Proposal	X												
Literature Review and Analysis	X	X											
Project Proposal Paperwork			X										
Designing Hardware - Transmitter - Receiver - Relay Control Circuit - Electrical Wiring			X	X	X								
Designing Software - Microcontroller			X	X	X								
First Presentation				X									
Project Progress Report				X	X								

PROJECT PLANNING												
	2006							**2007**				
Project's Activities	J	J	A	S	O	N	D	J	F	M	A	M	J
Identification and Preparing Component for - Transmitter - Receiver - Relay Control Circuit - Electrical Wiring			X	X	X	X							
Installation and Electrical Assembly for - Transmitter - Receiver - Relay Control Circuit - Electrical Wiring					X	X	X	X	X				
Integration of Hardware and Software Program							X	X	X	X			
Testing and Commissioning of - Transmitter - Receiver - Relay Control Circuit - Electrical Wiring								X	X	X	X		
Troubleshooting of Hardware and Software								X	X	X	X		
Final Presentation									X	X	X		
Final Project Report										X	X	X	

CHAPTER II

LITERATURE REVIEW

2.1   Introduction

This chapter will focus more on the explanations of the components that are in the project. The literature review is done so that a further and deeper understanding of the project can be gained. It is also as a main references and guidance for this *"Master Bedroom Remote Control System"* project.

Through the research that had been done through the internet, there are already a few products in the market that had already implemented the knowledge of controlling appliances, lamps and even home security system by using a remote controller. The usage of X10 [12] in home is one of the example of the product that already in the market nowadays.

Other related product that can be used as a references is *"Integrated Lighting Control System"* [13]. This system used an infrared control which was combined with the *X10 Control* and interfaced by using a computer. Both of the product use the application of the microcontroller. However, the difference that can be seen from the project *"Master Bedroom Remote Control System"* is that in this project; the type of remote control that used is a radio frequency remote control which had more advantages from the infrared remote control.